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Stock Market and Macroeconomic Performance in Ghana: New Evidence

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Abstract: **This study investigates the impact of macroeconomic variables and stock market development in Ghana. The frequency of the data is monthly starting from February 1998 to February 2013. The Persaran et al (2001) ARDL bounds testing cointegration approach confirms the long run relationship between considered variables. Results indicate that macroeconomic variables of foreign direct investment, gross domestic product, money supply and exchange rate have significant positive relationship with the stock market development in long run as well as in short run. The sensitivity analysis by dynamic ordinary least square (DOLS) confirmed the ARDL earlier results. It is also suggested that the economic growth and stable financials are better leading indicators of stock market development in Ghana. Consequently, policy makers should formulate policies for sustainable economic growth which can lead to development of Ghana stock exchange market. The policy implication is that resilient macroeconomic environment is a plus for stock market performance in Ghana.**

Keywords: **ARDL, macroeconomic variables, stock market development, cointegration, DOLS.**

1. INTRODUCTION

The notion that macroeconomic variables contain information to forecast stock market returns is still controversial. The common macroeconomic variables are foreign exchange rates, GDP, money supply, foreign inward direct investment and interest rates. Empirically studies have attempted to identify the most appropriate variables to explain stock market returns. Fama (1981) study the sources of variation in stock returns and find that changes in the discount rate over time and shocks to the discount rate in the valuation models of stock prices is crucial element. He finds that large fractions of stock variance can be attributed to the forecast of variables such as real GNP, industrial production and investment. Firms' cash flow is crucially determined by these variables. Households invest in the stock markets in order to diversify risk to smooth consumption when there is temporary shock to consumption. Hence some investors often tide their hard-earned income to the stock market with high expectation of better returns.

Despite these sound arguments, other evidence-based studies have been inconsistent on which direction macroeconomic variables influence stock market. Whiles some have shown strong positive relation of key macroeconomic indicators, others have shown negative and some no significant relationship (for discussion see Adam & Tweneboah, 2008; Aggrawal, 1981; Bilson, Timothy & Vincent, 2001; Flannery & Protopapadakis, 2004; Gay, 2008; Kwon & Shin, 1999; Nishat, 2004; Owusu-Nantwi & Kumowu, 2011; Soenen & Hannigar 1988). The pace of global economic shift from bank based to security based provides a basis for worrying about the inconclusiveness of the relationship between stock market and macroeconomic variables.

A critical evaluation of most of these past studies suggest that one contributing factor to the mixed results is methodological deficiency. Majority of the studies especially those on the Ghanaian stock market have applied the usual traditional techniques such as OLS, OLS-EG and cointegration (Johansen's approach). The problem with the OLS related approaches is non stationarity of the time series data. In resolving such non stationarity problems, the researchers have often resorted to the simplest technique of differencing the series until they are stationary (Diacogiannis, Tsiritakis & Manolas, 2001). Differencing the series rather than using the series at levels may cause the focus of such studies to be lost. This creates doubt in the validity of the results. The Johansen's cointegration was based on the assumption that all

the variables have integration order of one (I(1)). However, some studies have shown that most of the variables are fractionally integrated and therefore drawing conclusions from these studies can be incorrect and inaccurate (Guglielmo & Luis, 2011).

In this backdrop, the present study attempts to empirically review the role of key macroeconomic variables on the development of Ghana stock exchange using advanced econometric techniques. Motivated by recent substantial performance in both share indices and market capitalization in Ghana in the last decade in the face of erratic growth and economic performance in the same decade, the current study will unravel new dynamics in the determination of stock market development in Ghana. The findings are believed to have important policy implications aiding appropriate policy to boost stock market development in Ghana with possible effect of sustaining high economic growth.

The present study improves upon the previous studies in Ghana in two main ways. Firstly, previous studies have suffered methodological deficits regarding the use of combination of stationary and nonstationary variables as determinants of stock market development without applying appropriate econometric tools. The estimation techniques are weak in handling stationarity and fractional integration problems (Diacogiannis et al, 2001 and Saeedi & Amiri, 2010). The present study employed Autoregressive Distributed Lag (ARDL) model for empirical estimations which is suitable to handle both stationary and nonstationary variables. In addition, analysis of the determinants of stock market development, the behavioral models usually include several explanatory variables which are likely to be endogenous. Typical example is the relationship between GDP and stock market development. According to Pesaran, et al (2001), ARDL model has a capacity of addressing such potential endogeneity problem and possibility of residual serial correlation problems, which are likely to be encountered in empirical studies. Secondly, it uses the latest available data including a high frequency data which is monthly instead of annual used in previous studies.

Broad-based performance of the Ghanaian economy has been erratic with steady GDP growth rate of 14.4 percent, 7.7 percent, and 4 percent for 2011, 2010 and 2009 respectively (GSS, 2011, GSS, 2012; CEPA, 2012,) indicates possible decline in performance of the financial market in Ghana. However in spite of the abysmal performance of the Ghanaian economy, Ghana Stock exchange has experienced astronomical increase in the number of listed companies and stock market capitalization. This seems to question the nexus between macroeconomic variables and stock market performance. Motivated by the inconclusiveness in empirically studies (Gay, 2008; Holger, 2012; Hsing, 2011; Humpe& Macmillan, 2007) and mixed economic performance in Ghana this paper intend to apply dynamic ordinary least square technique (Watson and Stock, 1989) to re examine nexus between macroeconomic variables and stock market performance in Ghana. The study would inform the participants in financial market such as traders, businesses, financial institutions, professional investors, and policymakers to develop appropriate hedging and safety financial derivative mechanism to protect their investment by studying the economic policies of the government.

2. LITERATURE REVIEW

In recent times, studies have employed financial theories such as efficiency market hypothesis and portfolio theories to establish the relationship between macroeconomic variables and stock prices (Cheung & Ng, 1998; Jensen, 1969; Markowitz, 1952; and Ross, 1976). The efficient markets hypothesis maintains that market prices fully reflect all available information. Samuelson and Fama(1965, 1970) developed this idea independently in the 1960s and has then been applied extensively to theoretical models and empirical studies of financial securities prices, generating considerable controversy as well as fundamental insights into the price-discovery process. Modern portfolio theories explain how rational investors in perfect markets can minimise risk of investment without compromising return by diversifying and building up efficient portfolio investments. John Tobin modified this through his separation theory to give birth to new efficient frontier of investments for all investors. Application of the portfolio theories to project appraisal revealed that individual project or security risk is not important as its effect on portfolio overall risk. Security evaluation must correlate its risk with existing portfolio risk to assess its suitability. Many of the empirical evidence on the effect of macroeconomic variables on stock prices have often yielded mixed results and contradictions (Adam & Tweneboah, 2009; Aggrawal, 1981; Bilson, Timothy & Vincent, 2001; Flannery &Protopapadakis, 2004; Gay, 2008; Kwon & Shin, 1999; Nishat and Shaheen, 2004; Owusu-Nantwi&Kumowu, 2011; Soenen&Hannigar 1988).

Some studies (Ahmed, 2008; Kwon and Shin, 1999; Fernandez-Rodrigue, Gonzalez-Martel & Sosvilla-Rivero, 2000; Maghyereh, 2002) found causal links between aggregate macroeconomic variables and stock indices in the long-run when Toda-Yamamoto approach of Granger causality test was employed. Similarly, Adam and Tweneboah (2009) examined the macroeconomic factors and stock price movement in Ghana with quarterly data from 1991 to 2006 revealed

cointegration between macroeconomic variables and stock prices. Fifield, Power and Sinclair (2002) observed that the global and local marcroeconomics factors significantly explain returns in emerging stock markets but others(Bahmani-Oskooee and Sohrabian, 1992; Nieh and Lee (2001) found no evidence for cointegration between stock prices and exchange rates which most studies attribute the contradiction to variables and methods used in the analysis. Owusu-Nantwi and Kuwornu (2011) used the arbitrage pricing model for the period from January 1992 to December 2008, and revealed that only consumer price index had a significant effect on stock market returns.

3. VARIABLES DESCRIPTION

The empirical evidence revealed a range of macroeconomic variables for studies of stock market and macroeconomic performance **(**Chen, et al, 1986 and Fama, 1981). The current study used five major macroeconomic variables based on their mixed results in literature. The selected macroeconomic variables are foreign exchange rate, gross domestic product, money supply, consumer price index and foreign direct investment.

Flow-oriented' models of an exchange rate, which is based on the traditional macroeconomic view states that currency movement will affect the international competitiveness and the balance of trade position. The movement in currency resulting from current account balance in turn affects the country's real income and therefore stock prices (Dornbusch & Fisher, 1980). The exchange rate is the Ghana cedi per US dollar. Altay (2003) revealed that exchange rates influence stock returns and its underlying price. The exchange rate therefore influences business profitability and cash flow (Adam &Twenebuah, 2009). According to (Pebbles and Wilson, 1996; Bilson et al., 2001; Mukherjee and Naka, 1995; Aggarwal, 1981; Soenen and Hernigar, 1988; Ajayi and Mougoue, 1996; Adam &Tweneboah, 2009; Maghyereh, 2002), an appreciating local currency leads to significant increase in expected stock price returns and vice versa. Moore (2007) finds a cointegration relationship between stock prices and exchange rates for Poland and Hungary by taking into account the potential structural breaks in the two markets. Furthermore, some empirical evidences have shown no significant relation between exchange rate and stock price (Bahmani-Oskooee&Sohrabian, 1992; Nieh& Lee, 2001 and Owusu-Nantwi & Kuwornu, 2011). Given the inconclusive signing of exchange rate relation with stock price(Adam &Tweneboah, 2009; Bilson et al, 2001; Ibrahim &Yusoff, 1999 and Nieh & Lee, 2001), it is expected that the study would reveal negative relation between foreign exchange and stock price.

Empirical investigation of the impact of macroeconomic variables on stock returns in both long and short run revealed bidirectional causality between the variables. Studies posit that economic growth increase per capita income which also has direct significant effect on asset demand **(**Hsing, 2011; Humpe& Macmillan, 2007; Daferighe and Aje, 2009; Mohammad and Hussain, 2009; Gay, 2008; Holger, 2012, and Asaolu and Ogunmuyiwa, 2011). Thus the positive effect is attributed to the numerator effect of GDP in the asset valuation model. However, Asaolu and Ogunmuyiwa, (2011) found negative correlation between economic growth and stock market returns. Holger (2012) and Asaolu and Ogunmuyiwa, (2011) concluded that GDP growth actually matters little in terms of long-term stock return. *We hypothesis that GDP has no significant effect on stock market.*

Empirical evidence of money supply effect on stock price has been controversial. It has been argued that an increase in the money in circulation leads to the increase demand for financial market products, thus security prices will increase **(**Swanson 2011; Hancock and Passmore, 2011; Krishnamurthy and Vissing-Jorgenson , 2011; Wright, 2011 ,Maysami et al, 2004; Adam and Tweneboah,2009. However other studies have shown negative relations (Ibrahim &Yusoff, 1999; Humpe& Macmillan, 2007) because interest rates fall. Significant positive influence of money supply on stock market return (Adam &Tweneboah, 2009; Bilson et al, 2001; Bulmash&Trivoli, 1991; Humpe& Macmillan, 2007; and Maysami et al, 2004), others have shown negative relations (Ibrahim &Yusoff, 1999; Humpe& Macmillan, 2007). Applying arbitrage pricing theory, Humpe and Macmillan (2007) found that stock prices are significantly positively related to industrial production but insignificant (although positive) relationship between US stock prices and the money supply was found(Ibrahim and Yusoff, 1999; Mukherjee and Naka, 1995). However for Japanese data, money supply negatively affect stock price (Gan, Lee, Yong and Zhang (2006). We employ M2 measure of money supply because it includes assets that are highly liquid but not cash since modern economies often involve transfers between different account types. This was in line with empirical studies (Bilson et al, 2001; Maysami et al, 2004 and Ratanapakorn& Sharma, 2007). The study expects a positive relation between money supply and stock price.

Foreign capital inflows are a compliment to low domestic saving and investment. Foreign direct investment has positive effect on stock market development (Zafar 2013; Adam and Tweneboah, 2009; Oke 2012; Kaleem and Shahbaz 2009; Raza et al, 2012). Most of these studies employed cointegration and variance decomposition methodology. This study

expects FDI to be positively correlated with the development of equity markets because of its extra support to the supply of capital especially in a poor developing economy like Ghana. Foreign direct investment was measured by inward foreign direct investment and expressed in domestic currency.

4. GHANA STOCK EXCHANGE (GSE)

Promulgation of the Stock Market Act of 1971 led to the establishment of stock exchange market in Ghana and Accra Stock Market Limited (ASML) after many years of brooding. Political instability and unfavorable macroeconomic environment undermined the smooth takeoff of Stock Market activities in Ghana (Abugri, 2008). Two private stock brokerage firms, namely National Trust Holding Company Ltd (NTHC) and Merban Stockbrokers did over-the-counter (OTC) trading in shares of some foreign-owned companies prior to the establishment of the Ghana Stock Exchange in November 1990 (Adu, et al, 2013).

The Ghana Stock Exchange(GSE) was incorporated in July 1989 as a private company under the Ghana companies' code, 1963(Act, 179) but changed to a public company under the company's Code in April 1994. The stock exchange was given recognition as an authorized stock exchange under the Stock Exchange Act of 1971 and trading on the floor of the exchange commenced on November 12, 1990 with listed companies 13 in 1991 which jumped to 19 in 1995 and currently stands at 34 (GSE, 2011). The increase in the number of listings has also reflected in market capitalisation.

The GSE capital appreciated by 116 percent in 1993 and gained 124.3 percent in its index level in 1994 (GSE, 1995). This performance is partly attributed to high inflation and interest rate. In 2001, the volume increased to $55.3 million, fell to $44.12 million in 2002, inched up to $96.33 million in 2003. The All-Share Index topped performance of stock markets in the world with yield of 154.7 per cent (or 142.7 percent in dollar terms) in 2003 (GSE, 2005). After such a performance, the market Share Index has continued to fluctuate over time. Market capitalisation stood at US$ 2,644 million at the end of 2004 which increased to about $11.5billion in 2008. Annual turnover ratio just remains about 3.2 percent in 2004. In 2010 the shares traded and market capitalisation stood at GhS330.13million and GH¢151.13million respectively. The trading volume and values of shares were GhS 419.79million and GH¢446.56 million respectively were recorded in 2011 (GSE, 2011). Despite the unstable current economic, trading activity on the GSE for 2013 was very impressive; being the highest since the inception of the Exchange. The GSE Composite Index closed at 78.81% being 55.00% more than 2012 performance (23.81%) (GSE, 2013). All trading are carried on the floor of the exchange except Ashanti Gold shares which can be traded both through the GSI and over-the-counter after GSI trading hours, but all such trades must be subsequently reported to the GSI at the next trading session (Adam and Twenebuah, 2009). The main indices are the GSI All Share index and the Databank Stock Index (DSI).

5. DATA AND METHODOLOGY

5.1 Descriptions of data:

Ghana stock prices (P):

The study employed GSE all-share price index as a proxy for Ghana stock prices to serve as dependent variable. GSE all-share price index is a broad market indicator which measures the overall stock price performance. The index is computed by the Ghana stock exchange. The GSE all-share price index is calculated as natural logarithms of GSE all-share price index at time t and time t-1.

The data sets were obtained from the Bank of Ghana, International Financial Statistics of IMF and Ghana Stock Exchange. The data frequency is monthly spanning from February 1998 to February, 2013. The time frame was selected because of the availability of data. The sources of the data are considered relatively high degree of quality assurance and accuracy. Natural logarithms of all variables were used for the analysis.

5.2. Empirical Framework:

5.2.1 Unit Root Test

Both Augmented Dickey Fuller (*ADF*) and Phillip Perron (*PP*) unit root test are used to examine the stationary properties for long run relationship of time series variables t confirm the test. Augmented Dickey Fuller (*ADF*) test is based on equation given below:

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$$\Delta X_t = \alpha_0 + \phi t + \alpha_1 X_{t-1} + \sum_{i=1}^{k} \Delta X_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots(1)$$

Where Δ is first difference operator, X_t is a time series,

α_0 is the constant, k is the optimum numbers of lags of the dependent variable and ε_t is pure white noise error term. The null hypothesis is that the estimates α_1 coefficient is equal to zero for non stationary series otherwise stationary series. Thus, series is said to be stationary if the value of the coefficient is less than critical values from Fuller table. Phillip and Perron (PP) unit root test equation which follows the same hypothesis is given below:

$$\Delta X_t = \alpha_0 + \alpha_1 X_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots(2)$$

The Phillip and Perron unit root test is also based on t-statistics

5.2.2 ARDL Bound Testing Approach:

The Auto Regressive Distributed Lag method of cointegration developed by Pesaran and Pesaran *et al.* (2000, 2001) has been used in conjunction with the unrestricted vector error correction model to investigate the long run relationship between foreign capital inflows, economic growth and stock market development. The advantage of ARDL approach compared to other cointegraion methods is that it can be used if series are purely $I(0)$ or $I(1)$ It is also good for small sample size as well as endogenous explanatory variables. The ARDL model is developed for estimations as follow:

$$\Delta LP_t = \alpha_0 + \sum_{j=1}^{k} \alpha_i \Delta LP_{t-1} + \sum_{i=0}^{p} \delta_i \Delta LY_{t-1} + \sum_{i=0}^{q} \gamma_i \Delta LMS_{t-1} + \sum_{i=0}^{h} \varphi_j \Delta LFDI_{t-1} + \sum_{i=0}^{d} \lambda_i \Delta LEX_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots(3)$$

Where the error correction dynamics is denoted by summation sign while the second part of the equation corresponds to long run relationship, α_0 is constant and ε_t is white noise error term. Schwarz Bayesian Criteria (*SBC*) has been used to identify the optimum lag of one for the model and each series. Equation (3) now becomes ARDL (11111) and specified as

$$\Delta LP_t = \alpha_0 + \alpha_1 \Delta LP_{t-1} + \sum_{i=0}^{1} \delta_i \Delta LY_{t-1} + \sum_{i=0}^{1} \gamma_i \Delta LMS_{t-1} + \sum_{i=0}^{1} \varphi_j \Delta LFDI_{t-1} + \sum_{i=0}^{1} \lambda_i \Delta LEX_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots(4)$$

The basic fundamental requirement of ARDL is that there must be no serial correlation and if B-G LM serial correlation test accepts the null hypothesis of no serial correlation then equation (4) becomes

$$\Delta LP_t = \alpha_0 + \alpha_1 \Delta LP_{t-1} + \beta_1 LP_{t-1} + \beta_2 LY_{t-1} + \beta_3 LMS_{t-1} + \beta_4 LFDI_{t-1} + \beta_5 LEX_{t-1} + \sum_{i=0}^{1} \delta_i \Delta LY_{t-1} + \sum_{i=0}^{1} \gamma_i \Delta LMS_{t-1} + \sum_{i=0}^{1} \varphi_j \Delta LFDI_{t-1} + \sum_{i=0}^{1} \lambda_i \Delta LEX_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots(5)$$

Where β_i are lagged level of the time series. Equation (5) is estimated for the *F*-statistics value by using the appropriate ARDL models. Secondly, the Wald (*F*-statistics) test is used to investigate the long run relationship among the series. The null hypothesis of no cointegration is rejected if the calculated *F*-test statistics exceeds the upper critical bound (UCB) value. The results are said to be inconclusive if the *F*-test statistics falls between the upper and lower critical bound. Lastly, the null hypothesis of no cointegration is accepted if the *F*-statistics is below the lower critical bound. If long run relationship between macroeconomic variables is found then we estimate the long run coefficients. The following model will be use to estimate the long run coefficients:

5.2. 3 Sensitivity:

Dynamic ordinary least square is used to check for the robustness of initial results of long term coefficients. The robustness of the dependent variable with the explanatory variables in the long run is tested through Stock and Watson (1993) Dynamic Ordinary Least Square (DOLS) technique. This method involves estimating the dependent variable on

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explanatory variable in levels, leads and lags of the explanatory variable. The DOLS method resolves the issues of small sample bias, endogeneity and serial correlation problems by adding the leads or lags of explanatory variable (Stock and Watson, 1993). The equation of DOLS model is given by

$$LP_t = \pi_0 + \pi_1 X_t + \sum_{j=-p}^{p} \sum_{i=1}^{k} \theta_{ji} \Delta X_{i,t-1} + \varepsilon_t \ldots\ldots\ldots\ldots (6)$$

Where LP_t is the dependent variable, X_t is the vector of explanatory variables and Δ is the lag operator. The estimation of the augmented regression by least squares and the resulting estimator of β_i is called the dynamic OLS estimator and is denoted β_{iDOLS}. It is consistent, asymptotically normally distributed and efficient under certain assumptions (Stock and Watson, 1993). By expansion, the empirically equation can be derived from equation (2) as follows:

$$\begin{aligned} LP_t = {} & \beta_0 + \beta_1 LEX_t + \beta_2 LY_t + \beta_3 LMS_t + \beta_4 LFDI_t + \\ & \beta_5 \Delta LEX_{t+1} + \beta_6 \Delta LY_{t+1} + \beta_7 \Delta LMS_{t+1} + \beta_8 \Delta LFDI_{t+1} + \\ & \beta_9 \Delta LEX_{t-1} + \beta_{10} \Delta LY_{t-1} + \beta_{11} \Delta LMS_{t-1} + \beta_{12} \Delta LFDI_{t-1} \\ & \mu_t + \ldots\ldots (7) \end{aligned}$$

Where β_0 is the constant term representing risk free rate and also the intercept of the regression model and β_i are the coefficient of the macroeconomic variables. The leads and lags are represented by t+1 and t-1 respectively of variable i. and μ_t error of the regression.

6. ESTIMATIONS AND RESULTS

6.1 Descriptive Statistics:

The descriptive statistics of the variables of the study is reported in Table 1 below. All the variables have positive mean with exception of exchange rate that has negative mean value. Volatility of the variables revealed that FDI and money supply have high standard deviation while GDP has the least.

Table 1: Results of Descriptive Statistics

	GSI	FDI	EXR	GDP	CPI	M2
Mean	3.768	5.606	-0.459	2.269	2.858	7.098
Median	3.808	5.102	-0.138	2.266	2.766	7.129
Maximium	4.756	8.001	0.405	2.315	4.219	9.299
Minimum	2.999	3.948	-1.886	2.231	2.149	4.914
Std Dev	0.444	1.204	0.694	0.023	0.463	1.272
Skewness	-0.074	0.582	-0.779	0.193	0.712	-0.020
Kurtosis	2.408	1.959	2.166	1.866	2.846	1.738
Jacque Bera	2.812	18.412	23.552	10.821	15.486	12.021
Probability	(-0.245)	(-0.0001)	(-0.000008)	(0.00447)	(0.0004)	(0.00245)
Obs	181	181	181	181	181	181

The variables exhibit both long left and right tails since skewness has positive and negative values which deviate from zero. For instance, FDI and GDP are positively skewed and thus show that they are asymmetrical. Kurtosis's values of all variables in question also show no excess kurtosis because the values are less than three and Jacque-Bera statistics indicate that the variables are not normally distributed except share index.

6.2 Unit root test:

There is no need for pre testing of unit root since ARDL has the advantage of avoiding the classification of variable into *I(0)* or *I(1)*. However, the performance of unit root test in the ARDL is necessary to ensure that none of the variable is integrated at order **2** i.e. ***I(2)*** or beyond. Table 2 shows the unit root tests conducted to determine the stationarity of the variables. Augmented Dickey-Fuller (ADF) and Phillips- Perron test were used for conformational purpose.

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Table 2: Results of ADF and PP Tests					
	ADF				PP
Variable	ADF ,c	ADF,c,t		PP, c	PP, c,t
Level	t-stat.	t-stat.		Adj t-stat.	Adj t-stat.
GSI	-2.432[1]	-2.087[1]		-2.371[8]	-2.013[8]
	(0.1346)	(0.5491)		(0.1514)	(0.5900)
GDP	-2.575[2]	-1.213[2]		-2.575[8]	-1.039[9]
	(0.6574)	(0.5342)		(0.3245)	(0.9999)
EXR	-1.514[3]	-2.132[3]		-1.879[9]	-1.406[9]
	(0.5244)	(0.5242)		(0.3412)	(0.8563)
FDI	-0.0524[2]	-1.597[2]		-0.1578[8]	-1.713[8]
	(0.9611)	(0.7904)		(0.9692)	(0.7416)
CPI	-3.048[1]**	-3.259[1]*		-2.972[6]**	-3.146[6]*
	(0.0325)	(0.0767)		(0.0395)	(0.0991)
M2	-2.221[12]	-1.3095[13]		-2.068[23]	-2.924[11]
	(0.1995)	(0.8821)		(0.1308)	(0.1573)
TB	-1.271[1]	-2.324[1]		-1.218[8]	-2.182[8]
	(0.6428)	(0.4148)		(0.6666)	(0.4963)
First Difference					
ΔGSI	-7.354[0]***	-7.534[0]***		-7.593[6]***	-7.757[6]***
	(0.000)	(0.000)		(0.000)	(0.000)
ΔGDP	-11.808[2]***	-4.763[1]***		-7.334[7]***	-8.798[7]***
	(0.000)	(0.0008)		(0.000)	(0.000)
ΔEXR	-3.176[2]***	-3.247[2]*		-4.099[3]***	-4.219[3]***
	(0.0231)	(0.0788)		(0.0013)	(0.0052)
ΔFDI	-6.261[1]***	-6.400[1]***		-10.201[7]***	-10.388[7]***
	(0.000)	(0.000)		(0.000)	(0.000)
ΔCPI	-8.918[0]***	-8.179[0]***		-8.896[3]***	-8.899[3]***
	(0.000)	(0.000)		(0.000)	(0.000)
ΔM2	-11.863[11]***	-13. 065(0)***		-14.000[29]***	-14.127[24]***
	(0.000)	(0.0056)		(0.000)	(0.000)
ΔTB	-6.829[0]***	-6.814[0]***		-6.953[6]***	-6.940[6]***
	(0.000)	(0.000)		(0.000)	(0.000)
Note: *. ** and *** denotes significant level at 10%, 5% , 1% respectively					
In brackets are lag length for ADF test and Bartlett kernel Bandwidth					
In parenthesis is the probability of accepting null hypothesis. The c and c, t represents estimation without trend and with trend.					

Both results indicate that all the data are non-stationary at 5% significant level except consumer price index which was stationary at 5% significance level. However, rest of the variables are I (1). Since some of the variables are I(0) and I(1) we decided to use the Pesaran et al(2001) bounds testing. The lag selection method also indicated largest lagged order of one and two. Table 3 shows the results.

From Table 4, variables such as D(M(-1)) are short run variables and GSI(-1) indicates long run variables. For the long run variables only exchange rate and consumer price index are not statistically different from zero. The rest of the long run variables are statistically significant at 1%, 5% and 10% and also have the right signs. For instance, a cedi increment in the gross domestic product would lead to about 44% increase in Ghana stock market.

Table 3: Long Run Results using ARDL Approach			
Variable	Coefficient	t stat.	Prob
C	3.571**	2.743	0.0068
D(GSI(-))	0.297***	4.226	0.0000
D(FDI(-1))	0.0203	0.5069	0.6129
D(FDI(-2))	0.0193	0.4918	0.6235
D(GDP(-1))	9.112***	4.359	0.0000
D(EXR(-1))	-0.679***	-3.209	0.0016
D(CPI(-1))	-0.0114	-0.313	0.7550
D(CPI(-2))	-0.0803**	-2.124	0.0352

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D(M(-1))	-1.188	-0.8718	0.3846
GSI(-1)	0.0336**	1.992	0.0481
FDI(-1)	0.0181*	1.787	0.0759
GDP(-1)	0.4448***	2.782	0.0060
EXR(-1)	-0.0289	-0.6216	0.5351
CPI(-1)	-.0143	-1.0333	0.3030
M(-1)	1.0062**	2.109	0.0365
Adj. R	0.42		
DW	2.07		
F	10.03		0.0000
Author's estimation			
Note: *, ** *** are significant at 10%, 5% and 1% respectively			

Statistically significant at 1% in the short run are exchange rate, Ghana stock market development, consumer price index and gross domestic product. Short run changes in these variables will positively influence the development of the Ghana stock exchange. Long run coefficients test based on the Wald test revealed Chi-square 20.467(0.0023) (see appendix B). The ARDL results of Wald Test for cointegration test rejected the null hypothesis of no cointegration because the value of the *F*- statistics is greater than upper bound critical value at 5% level of significance in favor of alternative hypothesis that the valid long run relationship exists between stock market development and macroeconomic variables. The lower and upper bounds critical value at 5% from Pesaran and Shin (2001) table are 4.94 and 5.73 respectively indicating long run relationship between stock market development and macroeconomic variables. The significant Wald test concludes for cointegration among the dependent and independent variables implying that there is long run relationship between stock market development and selected macroeconomic variables. Diagnostic check of the results shows no autocorrelation by Breusch-Godfrey LM Test. Both F-statistic 1.775(0.1728) and Chi-Square(2) 3.840(0.1466) indicate that there is no serial correlation problem among the variables. However, stability test by Cusum at five percent appeared significant meaning that macroeconomic variables are stable over time.

Table 4: Short Run Dynamics Results using ARDL Approach

Variable	Coefficient	t stat.	Prob
C	-0.0217**	-2.224	0.0275
D(GSI(-))	0.3656***	5.2034	0.0000
D(FDI(-1))	0.0024	0.0614	0.9511
D(FDI(-2))	0.0279	0.7099	0.4788
D(GDP(-1))	5.6997***	3.3005	0.0012
D(EXR(-1))	-0.5808***	-3.0349	0.0028
D(CPI(-1))	-0.0062	-0.1665	0.8679
D(CPI(-2))	-.0538	-1.4391	0.1520
D(M(-1))	-0.4531	-0.3323	0.7401
ECT(-1)	-0.0321*	-1.8631	0.0642
Adj. R	0.38		
DW	1.99		
F	12.84		0
Note: *, ** *** are significant at 10%, 5% and 1% respectively The ECT is the error correction term			

The presence of an error-correction term among a co-integrated variables means that variations in the stock market development are dependent on the levels of disequilibrium in the co-integration relationship specified by the ECT and the changes in the other explanatory variables. Thus any deviation from the long run equilibrium will feed back on the changes in the dependant variable in order to force the movement towards the long run equilibrium (Masih & Masih, 2002). Table 4 represents the short run relationship between macroeconomic variables and stock market development. Results indicate that the error correction term for the estimated stock market development is both negative and statistically significant. This confirms a valid cointegration between macroeconomic variables and stock market development in Ghana. The coefficient of error term is -0.0321 which suggests that about 3.2% of disequilibrium is corrected each month. However, it must be said that speed of adjustment from short run to long span of time is slow. In short run, GDP is linked positively. Gross domestic product and stock market development are correlated positively while exchange rates are negatively correlated. Both GDP and exchange rates are showing dominating impact on stock market development in

short run. In short run, foreign direct investment is correlated positively but insignificant. This again shows that in short time, foreign direct investment and stock market development nexus is complementary. Increase in inflation and money supply is associated negatively with stock market development but insignificant too.

Diagnostic tests base on serial correlation and stability tests show that short-run model passes the sensitivity analysis. No evidence of autocorrelation. Finally, the stability of the long-run coefficients together with the short run dynamics is checked by the cumulative sum (CUSUM) with recursive residual (Figures B). The null hypothesis of cumulative sum that the regression equation is correctly specified cannot be rejected since the plot of these statistics remains within the critical bounds of the 5% significance level. Figures B show that the plot of CUSUM is within the boundaries. These statistics confirm the stability of the long run coefficients of regressors that affect the stock market development.

Table 5 represents the results of dynamic ordinary least square of stock market development model. The *DOLS model was* run with lead and lag of 1. It is confirmed from the results that the coefficients of explanatory variables (macroeconomic variables) do not remain the same sign though still significance after taking the different lag and lead in the model. Surprisingly, consumer price index and foreign direct investment had their signs changed to negative but remain significance. The negative correlation of foreign direct investment with stock market development may be due to the fact that it is substitute instead of being complimentary. We therefore conclude that the relationship between considered variables in Ghana remains the same and initial results are robust.

Table 5: Dynamic Ordinary Least Square

Variable	coefficient	t-stats	Prob
FDI	-0.211***	-2.55834	0.0115
GDP	4.519*	1.895443	0.0599
EXR	-2.011***	-10.88324	0.0000
CPI	0.158	1.549172	0.1234
M2	1.915***	4.54054	0.0000
Constant	33.551*	1.69448	0.0922
Adj. R squared	0.81		
Note: *, ** *** are significant at 10%, 5% and 1% respectively			
Prob. Is the probability of accepting the null hypothesis			

7. CONCLUSION AND RECOMMENDATIONS

This study investigates the impact of macroeconomic variables and stock market development in Ghana. The frequency of the data is monthly starting from February 1996 to February 2011. The Persaran et al (2001) ARDL bounds testing cointegration approach confirms the long run relationship between considered variables. Results indicate that macroeconomic variables of foreign direct investment, gross domestic product, money supply and exchange rate have significant positive relationship with the stock market development in long run as well as in short run. The sensitivity analysis by dynamic ordinary least square (DOLS) shows that the macroeconomic explanatory variables retain their signs and significance in the sensitivity analysis with exception of foreign direct investment which negative but remains statistically different from zero. Consequently it can be concluded that the relationship between considered variables and stock market development in Ghana is robust.

It is suggested that in Ghana, investors can make their investment decisions through an eye on the dynamism of exchange rate, money supply and economic growth since foreign direct investment appears to go into direct productive activities like mining. From a policy perspective, government and policy makers should try to ensure stable currency value to facilitate financial and economic development in Ghana. It is also suggested that the economic growth is a better leading indicator for stock market development in Ghana. Consequently, policy makers should formulate policies for sustainable economic growth which can lead to development of Ghana stock exchange market.

REFERENCES

[1] Abugri, B. A., (2008). Empirical Relationship Between Macroeconomic Volatility And Stock Returns: Evidence from Latin American Markets. *Int. Rev. Finance. Anal.*, Vol. 17, pp. 396–410.

[2] Adu, G., Marbuahb, G. And Mensah, T.J., (2013). Financial Development and Economic Growth in Ghana: Does The Measure Of Financial Development Matter? *Review of Development Finance* Vol.3, pp. 192–203.

[3] Adam, A. M. and G. Tweneboah, 2009, Foreign Direct Investment and Stock Market Development: Ghana's Evidence, International Research Journal of Finance and Economics, Vol. 26, pp. 178-185.

[4] Aggarwal, R. (1981). Exchange Rates And Stock Prices: A Study of the US Capital Markets Under Floating Exchange Rate: Aggregate Stock Returns, *Journal Global Finance*, Vol. 30(9), pp. 20-35.

[5] Ahmed, S. (2008). Aggregate Economic Variables and Stock Markets in Indian. *International Research Journal of Finance and Economics*, Vol.14, pp. 141-164.

[6] Ajayi, R.A. and M. Mougoue.(1996) On the Dynamic Relation between Stock Prices and Exchange Rates. The Journal of Financial Research, Vol.19, pp.193-207.

[7] Altay, E., (2003). The Effect of Macroeconomic Factors on Asset Returns: A Comparative Analysis of the German and The Turkish Stock Markets in An APT Framework, Martin Luther-Universität Halle, Betriebswirts chaftliche Diskussionsbeiträge, Nr. 48/2003.

[8] Asaolu, T.O. & Ogunmuyiwa, M.S., (2011). An Econometric Analysis of the Impact of Macroeconomic Variables on Stock Market Movement in Nigeria, *Asian Journal of Business Management*, Vol.3, pp. 72-78.

[9] Bahmani-Oskooee, M. and A. Sohrabian, (1992) Stock Prices and the Effective Exchange Rate of the Dollar. Applied Economics Vol. 24,pp. 459-464.

[10] Bilson, C.M., Timothy, J.B., and Vincent, J.H. (2001). Selecting Macroeconomic Studies on Stock Price Volatility Changes," Proceedings of the Business and Economic Statistics Section, pp.177-81.

[11] Bulmash, S., and Trivoli, G. (1991).Time-Lagged Interactions Between Stock Prices and Selected Economic Variables. *Journal of Portfolio Management*, Vol. 17(4), pp. 61-7.

[12] CEPA. (2012). Overview of 2012 Budget of Government of Ghana and Macroeconomic Management.

[13] Chen, N. F., Roll, R., and Ross, S. (1986). Economic Forces and the Stock Market. Journal of Business Vol. 59(3), pp. 83-403.

[14] Cheung, Y., and Ng, L. (1998). International Evidence on the Stock Market and Aggregate Economic Activity. *Journal of Empirical Finance*, Vol. 5, pp. 281-296.

[15] Daferighe, E. E. and Aje, S. O. (2009). An Impact Analysis of Real Gross Domestic Product, Inflation and Interest rates on stock prices of quoted companies in Nigeria. *International Research Journal of Finance and Economics*, Vol. 25, pp 53-63.

[16] Diacogiannis, G.P., Tsiritakis, E. D., and Manolas, G. A. (2001). Macroeconomic Factors and Stock Returns in a Changing Economic Framework: The Case of the Athens Stock Exchange. *Managerial Finance*, Vol. 27(6), pp. 23-41

[17] Dornbusch, R., & Fisher, S. (1980). Exchange Rates and the Current Account. *American Economic Review*, 70, 960–971.

[18] Fama E.F. (1981), Stock Returns, Real Activity, Inflation and Money. American Economic Review, Vol. 71(4), pp. 545-565

[19] Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance* Vol.25, pp. 383–417.

[20] Fernandez-Rodriguez, F., Gonzalez-Martel, C. And Sosvilla-Rivero,S.(2000). On The Profitability of Technical Trading Rules Based on Artificial Neural Networks: Evidence From The Madrid Stock Market. *Economic Letters*, 69.

[21] Fifield, S.G.M., Power, D.M. and Sinclair, C.D. (2002) Macroeconomic Factors and Share Returns: An Analysis Using Emerging Market Data. *International of Finance and Economics*, Vol.7(1), pp. 51-62 DOI: 10.1002/ijfe.173

[22] Flannery, M. J., and Protopapadakis, A. (2004). Factors Do Influence Fox, John. Applied Regression Analysis, Linear Models, and Related Methods. Thousand Oaks, Ca., Sage Publications,

[23] Gan, C., Lee, M., Young, H.W.A., & Zhang, J. (2006). Macroeconomic Variables and Stock Market Interaction :New Zealand Evidence, *Investment Management and Financial Innovations*,Vol.3,(4), pp. 89-101

[24] Gay-Jr, R.D. (2008), Effect of Macroeconomic Variables on Stock Returns for Four Emerging Economics: Brazil, Russia, India and China. *International Business & Economics Research Journal, Vol.* 7(3), pp. 1-8.

[25] Ghana Stock Exchange Quarterly Report, March 1995

[26] Ghana Stock Exchange Annual Report, 2005

[27] Ghana Stock Exchange Annual Report, 2011

[28] Ghana Statistical Service Economic Performance Report, 2011

[29] Ghana Statistical Service Economic Performance Report, 2012

[30] Hancock, D. and Passmore, W. (2011). "Did the Federal Reserve's MBS Purchase ProgramLower Mortgage Rates?". Finance and Economics Discussion Series 2011–01, pp 1–62.

[31] Holger Sandte (2012) Stock Markets vs GDP Growth: A Complicated Mixture, WestLB Mellon Asset Management, pp 1-12.

[32] Humpe, A., and Macmillan, P. (2007) Can Macroeconomic Variables Explain Long Term Stock Market Movements? A comparison of the US and Japan. *CDMA Working Paper* No. 07/20

[33] Hsing, Y., (2011), The Stock Market and Macroeconomic Variables in a BRICS Country and Policy Implications, *International Journal of Economics and Financial Issues*, Vol. 1(1), pp. 12-18.

[34] Ibrahim, M., and Yusoff. (1999). Macroeconomics Variables and Stock Price in Malaysia: An Empirical Analysis. *Asian Economic Journal*, Vol. 13(2), pp.219-231.

[35] Jalloh, M.,(2009). The Role of Financial Markets In Economic Growth; Waifem Regional Course on Operations and Regulation of Capital Market, Accra, Ghana

[36] Jensen, M., (1969). Risk, the Pricing of Capital Aasets, and The Evaluation of Investment Portfolios. *Journal of Business*, Vol.42(2), pp 167-247

[37] Kaleem, R. & Shahbaz, M. (2009). Impact of Foreign Direct Investment on Stock Market Development: The Case of Pakistan. *9th Global Conference on Business and Economics,Cambridge University*, Uk

[38] Krishnamurthy, A. and Vissing-Jorgensen, A. (2011). "The Effects of Quantitative Easing on Long-term Interest Rate". Northwestern University Working Paper, pp 1–47.

[39] Kwon, S.K., and Shin, T.S. (1999).Cointegration and Causality Between Macroeconomic Variables and Stock Market Returns. *Global Finance Journal*, Vol. 10:pp.71-81.

[40] Maghayereh, A. (2002), „Causal Relations among Stock Prices and Macroeconomic Variables in the Small, Open Economy of Jordan" [Online] Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=317539 [Accessed 15th March 2012].

[41] Maysami, R. C., Howe, L. C., and Hamzah, M. A. (2004) Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore"s All-S Sector Indices", Jurnal Pengurusan Vol. 24, pp. 47-77

[42] Markowitz, H. (1952). Portfolio Selection. Journal of Finance, Vol. 7(1), 77-91.

[43] Mohammad, S. D., A. Hussain, M.A. Jalil, A., Ali, (2009). Impact of Macroeconomics Variables on Stock Prices: Empirical Evidence in Case of KSE (Karachi Stock Exchange) European Journal of Scientific Research, Vol.38(1), pp.96-103.

[44] Moore, T. (2007). Has Entry to the European Union Altered the Dynamic Links of Stock Returns for the Emerging Markets? *Applied Financial Economics*, Vol. 17, pp. 1431–1446

[45] Mukherjee, T. K., and Naka, A. (1995). Dynamic Relations Between Macroeconomic Variables and The Japanese Stock Market: An Vector Application of Error Correction Model. *The Journal of Financial Research*, Vol. 18(2), pp.223-237.

[46] Nieh, C., and Lee, C., (2001). Dynamic Relationship between Stock Prices and Exchange Rate of G7 Countries. *Quarterly Review of Economic and Finance*, Vol. 41, pp. 477-490

[47] Nishat , Mohammed and Shaheen Rozina(2004) Macroeconomics Factors and Pakistan Equity Market, *The Pakistan Development Review*, Vol. 43(4), pp. 619-637

[48] Oke, M. O. (2012) Foreign Direct Investment and the Nigerian Financial Sector Growth, *Asian Economic and Financial Review*, Vol. 2(2), pp. 262-275.

[49] Owusu-Nantwi, V., and Kuwornu, J. K. M.(2012) Analysing the Effect of Macroeconomic Variables on Stock Market Returns: Evidence from Ghana. *Journal of Economics and International Finance*, Vol.3 (11), pp. 605-615.

[50] Pebbles G, and Wilson, P., (1996).The Singapore economy. Cheltenham, UK: Edward Elgar.

[51] Pesaran, M. Hashem, Shin, Yongcheol and Smith, Richard J. (2000) Structural Analysis Of Vector Error Correction Models With Exogenous I(1) Variables. *Journal of Econometrics* Vol. 97, pp 293-343

[52] Pesaran, M. Hasem Yongcheol Shin and Richard, J. Smith (2001), Bounds Testing Approaches to the Analysis of Level Relationships, *Journal of Applied Econometrics*, Vol. 16(3), pp.289-326.

[53] Ratanapakorn, O., and Sharma, S., (2007). Dynamic Analysis Between US Stock Returns And Macroeconomic Variables. *Applied Financial Economics*,Vol.17, pp.369-377.

[54] Raza, A., Iqbal, N., Ahmed, Z., Ahmed, M. and Ahmed, T. (2012) The Role of FDI on Stock Market Development: The Case of Pakistan, *Journal of Economics and BehavioralStudies* Vol. 4(1), pp. 26-33.

[55] Ross, S. A., (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, Vol. 13, pp. 341-360.

[56] Saeedi, P. &A. Amiri, (2010). The Investigation Of Macroeconomic Variables Relation with TSE", *Economic Modeling Quarterly*, Vol. 2, pp. 111-130.

[57] Samuelson, Paul. (1965). Proof That Properly Anticipated Prices Fluctuate Randomly. *Industrial Management Review* Vol. 6, pp. 41–9.

[58] Soenen, L. A., &Hennigar, E.S. (1988). An Analysis of Exchange Rates and Stock Prices: The US Experience between 1980 And 1986. *Akron Business and Economic Review* Vol. 19, pp. 71-76

[59] Stock, J. H., and Watson, M. W. (1989), "New Indexes of Coincident and Leading Economic Indicators," NBER Macroeconomics Annual, 351–393.

[60] Stock, J.H., & Watson, M.W., (1993). A Simple Estimator of Cointegrating Vectors in Higher Order Integrated Systems," Econometrica, Vol. 61, pp. 783-820.

[61] Swanson, E. (2011). "Let's Twist Again: A High-Frequency Event-Study Analysis of Operation Twist and Its Implications for QE2". Brookings Papers on Economic Activity, Spring, pp 151–187.

[62] Wright, J. (2011). "What does Monetary Policy do to Long-term interest rates at the Zero Lower Bound?" NBER Working Paper 17154, pp1–37.

[63] Zafar, M. (2013) Determinants of Stock Market Performance in Pakistan, *Interdisciplinary Journal of Contemporary Research in Business*, Vol. 4(9), pp. 1017-1026.